

**From:** [Nancy Dorsey](#)  
**To:** [Bill Leith](#)  
**Subject:** Re: for quick review please  
**Date:** 12/18/2012 04:43 PM

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Hi Bill,

Please disregard the document that Omar sent! There are too many versions slopping around and it is not supposed to be out yet.

thank you,  
Nancy

▼ Omar Martinez---12/18/2012 04:40:26 PM---Nancy: I resent the whole draft document to Bill Leith because the formatting was incorrect.

From: Omar Martinez/R6/USEPA/US  
To: Nancy Dorsey/R6/USEPA/US@EPA  
Cc: Bill Leith <wleith@usgs.gov>, Philip Dellinger/R6/USEPA/US@EPA, Omar Martinez/R6/USEPA/US@EPA  
Date: 12/18/2012 04:40 PM  
Subject: Re: for quick review please

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Nancy:

I resent the whole draft document to Bill Leith because the formatting was incorrect. He told me was going to look at it again. Only what you asked him to review.

Thanks,

Omar T. Martinez  
Environmental Scientist  
Ground Water/UIC [6WQ-SG]  
U.S. EPA / Region 6  
Direct: (214) 665-8485  
Fax: (214) 665-2191

▼ Nancy Dorsey---12/18/2012 04:15:38 PM---Thank you Bill ( and Bill) for your prompt response, we appreciate it! Nancy

From: Nancy Dorsey/R6/USEPA/US  
To: Bill Leith <wleith@usgs.gov>  
Cc: Omar Martinez/R6/USEPA/US@EPA, Philip Dellinger/R6/USEPA/US@EPA  
Date: 12/18/2012 04:15 PM  
Subject: Re: for quick review please

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Thank you Bill ( and Bill) for your prompt response, we appreciate it!

Nancy

▼ Bill Leith ---12/18/2012 04:05:06 PM---Nancy, Thank you for the opportunity to review and comment on the draft. Bill Ellsworth provided su

From: Bill Leith <wleith@usgs.gov>  
To: Nancy Dorsey/R6/USEPA/US@EPA  
Cc: Philip Dellinger/R6/USEPA/US@EPA, Omar Martinez/R6/USEPA/US@EPA  
Date: 12/18/2012 04:05 PM  
Subject: Re: for quick review please

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Nancy,

Thank you for the opportunity to review and comment on the draft. Bill Ellsworth provided suggestions, questions and comments in the attached document. We hope these are useful.

With regards,

--Bill

William Leith, Ph.D.  
Senior Science Advisor for Earthquake  
and Geologic Hazards  
U.S. Geological Survey  
905 National Center, Reston VA 20192  
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[attachment "EPA letter pinto\_362.docx" signed by Nancy Dorsey/R6/USEPA/US]

On Dec 17, 2012, at 3:55 PM, [Dorsey.Nancy@epamail.epa.gov](mailto:Dorsey.Nancy@epamail.epa.gov) wrote:

As my boss, Phil Dellinger discussed with you, we would like to make you aware of some recommendations that EPA is proposing to the Oklahoma Department of Environmental Quality with respect to a specific well permit. Please let us know your comments as soon as possible. If you need to discuss it further please feel free to give me a call.

The relevant portion of the letter is as follows.

1. Given the limited geologic understanding, fall-off test evidence of nearby boundary conditions, and the proximity to an area exhibiting recent seismic activity, the following additional permit requirements are recommended:
  - a. Continuous recording of injection rate and pressure, as required under 40 CFR146.13(b)(2). The results should be provided to ODEQ at a pre-defined timing, as both daily averages and plotted in a Hall plot in Excel or a similar spreadsheet.
  - b. An annual fluid profile test to verify where the injected fluid is leaving the wellbore. This should be either a temperature survey or a radioactive tracer depending on required clarity of the results.
  - c. Set-up and provide continuous monitoring of sufficient seismometers to

identify the specific source of any new seismicity in the immediate area. These should be in-place prior to injection. The Oklahoma Geologic Survey geophysical observatory staff will be your best resource for specific details.

2. Create a contingency plan in the permit for required actions to be followed in case seismic activity is identified in the immediate area. These would use threshold events to trigger specific actions, such as the following examples:

- a. Increasing frequency or clusters of small detected seismic events in the area.
  - i. Increase monitoring frequency of injection parameters, such as formation pressure and rates, and increase frequency of reporting of the information to ODEQ.
- b. Any events above a pre-defined background level, up to magnitudes felt only in the immediate area.
  - i. Increase monitoring of fluid specific gravity, since the density impacts the bottomhole pressure in the well.
- c. Events felt at a greater distance, with no reported damage.
  - i. Reduce the injection rate
  - ii. Inject intermittently to allow time for pressure dissipation, with the amount of shut-in time needed being site-specific
- d. Events that cause damage
  - i. Cease injection

regards,  
Nancy

Nancy S. Dorsey  
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Oklahoma Class II Program Manager  
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